IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) A ballistic magnetoresistive sensor, comprising:

a first pinned layer;

a first free layer;

a magnetic nickel nano-contact layer disposed between the pinned layer and the free layer, the magnetic nickel nano-contact layer having a width equal to a width of the first pinned layer and the first free layer; and

a first and second lead layer disposed proximate to the pinned layer and free layer respectively for providing a sense current that flows perpendicular to the planes of the layers.

2. (Original) The ballistic magnetoresistive sensor of claim 1 further comprising layers of tantalum disposed between the pinned layer and between the first lead and the free layer and the second lead.

3. (Original) The ballistic magnetoresistive sensor of claim 1, wherein the first pinned layer, first free layer, nickel nano-contact layer and first and second lead layers form a nano-contact region.

4. (Currently Amended) The ballistic magnetoresistive sensor of claim 1 ~~further comprising outside structures disposed on opposite sides of the nano-contact region, the outside structures comprising a second and third pinned layer, a second and third free layer, a first and second insulation layer disposed between the second pinned layer and the second free layer and between the third pinned layer and the third free layer, and outside lead layers disposed proximate to the second and third pinned layers and the second and third free layer~~ , wherein the first pinned layer, the first free layer, the nickel nano-contact layer and the first and second lead layer are formed in a nano-contact region, the ballistic magnetoresistive sensor further comprising, disposed in outside regions on opposite sides of the layers of the nano-contact region, a third lead layer and a fourth lead layer formed on opposite sides of the first lead layer, a second pinned layer and a third pinned layer formed on opposite sides of the first pinned layer, a second free layer and a third free layer formed on opposite sides of the first free layer, a first insulation layer formed between the second pinned layer and the second free layer, a second insulation layer formed between the third pinned layer and the third free layer, the first insulation layer and the second insulation layer formed on opposite sides of the nickel nano-contact layer and a fifth lead layer and a sixth lead layer formed on opposite sides of the second lead layer.

5. (Original) The ballistic magnetoresistive sensor of claim 4, wherein the pinned layers comprise a layer of nickel and a layer of cobalt iron (CoFe).

6. (Original) The ballistic magnetoresistive sensor of claim 4, wherein the free layers comprise a layer of nickel iron (NiFe).

7. (Currently Amended) The ballistic magnetoresistive sensor of claim [[1]] 4 further comprising layers of tantalum disposed between the second pinned layer and ~~one of the outside lead layers~~ the third lead layer, between the third pinned layer and ~~one of the outside lead layers~~ the fourth lead layer, between the second free layer and ~~one of the outside lead layers~~ the fifth lead layer, and between the third ~~pinned~~ free layer and ~~one of the outside lead layers~~ the sixth lead layer.

8. (Original) The ballistic magnetoresistive sensor of claim 1, wherein the pinned layer comprises a layer of nickel and a layer of cobalt iron (CoFe).

9. (Original) The ballistic magnetoresistive sensor of claim 1, wherein the free layer comprises a layer of nickel iron (NiFe).

10. (Currently Amended) A magnetic storage device, comprising:

at least one magnetic storage medium;

a motor for moving the at least one magnetic storage medium;

a ballistic magnetoresistive sensor for reading data on the at least one magnetic storage medium, and

an actuator assembly, coupled to the ballistic magnetoresistive sensor, for moving the ballistic magnetoresistive sensor relative to the at least one magnetic storage medium, the ballistic magnetoresistive sensor further comprising:

a first pinned layer;

a first free layer;

a magnetic nickel nano-contact layer disposed between the pinned layer and the free layer, the magnetic nickel nano-contact layer having a width equal to a width of the first pinned layer and the first free layer; and

a first and second lead layer disposed proximate to the pinned layer and free layer respectively for providing a sense current that flows perpendicular to the planes of the layers.

11. (Original) The magnetic storage device of claim 10 further comprising layers of tantalum disposed between the pinned layer and the first lead and between the free layer and the second lead.

12. (Original) The magnetic storage device of claim 10, wherein the first pinned layer, first free layer, nickel nano-contact layer and first and second lead layers form a nano-contact region.

13. (Currently Amended) The magnetic storage device of claim 10 ~~further comprising outside structures disposed on opposite sides of the nano-contact region, the outside structures comprising a second and third pinned layer, a second and third free layer, a first and second insulation layer disposed between the second pinned layer and the second free layer and between the third pinned layer and the third free layer, and outside lead layers disposed proximate to the second and third pinned layers and the second and third free layer~~ , wherein the first pinned layer, the first free layer, the nickel nano-contact layer and the first and second lead layer are formed in a nano-contact region, the ballistic magnetoresistive sensor further comprising, disposed in outside regions on opposite sides of the layers of the nano-contact region, a third lead layer and a fourth lead layer formed on opposite sides of the first lead layer, a second pinned layer and a third pinned layer formed on opposite sides of the first pinned layer, a second free layer and a third free layer formed on opposite sides of the first free layer, a first insulation layer formed between the second pinned layer and the second free layer, a second insulation layer formed between the third pinned layer and the third free layer, the first insulation layer and the second insulation layer formed on opposite sides of the nickel nano-contact layer and a fifth lead layer and a sixth lead layer formed on opposite sides of the second lead layer.

14. (Original) The magnetic storage device of claim 13, wherein the pinned layers comprise a layer of nickel and a layer of cobalt iron (CoFe).

15. (Original) The magnetic storage device of claim 13, wherein the free layers comprise a layer of nickel iron (NiFe).

16. (Currently Amended) The magnetic storage device of claim [[10]] 13 further comprising layers of tantalum disposed between the second pinned layer and ~~one of the outside lead layers~~ the third lead layer, between the third pinned layer and ~~one of the outside lead layers~~ the fourth lead layer, between the second free layer and ~~one of the outside lead layers~~ the fifth lead layer, and between the third ~~pinned~~ free layer and ~~one of the outside lead layers~~ the sixth lead layer.

17. (Original) The magnetic storage device of claim 10, wherein the pinned layer comprises a layer of nickel and a layer of cobalt iron (CoFe).

18. (Original) The magnetic storage device of claim 10, wherein the free layer comprises a layer of nickel iron (NiFe).

19-27. (Canceled)

28. (Currently Amended) A ballistic magnetoresistive sensor, comprising:

means for providing a pinned layer;

means for providing a free layer;

means for providing a magnetic nickel nano-contact layer disposed between the means for providing a pinned layer and the means for providing a free layer, the magnetic nickel nano-contact layer having a width equal to a width of the means for providing a pinned layer and the means for providing a free layer; and

means for providing a first and second lead layer disposed proximate to the means for providing the pinned layer and free layer respectively, the means for providing a first and second lead layer providing a sense current that flows perpendicular to the planes of the layers.

29. (Currently Amended) A magnetic storage device, comprising:

means for recording magnetic data thereon;

means for moving the means for recording magnetic data;

means for reading data on the means for recording magnetic data; and

means, coupled to the means for reading, for moving the means for reading relative to the means for storing data, the means for reading further comprising:

means for providing a pinned layer;

means for providing a free layer;

means for providing a magnetic nickel nano-contact layer disposed between the means for providing a pinned layer and the means for providing a free layer, the magnetic nickel nano-contact layer having a width equal to a width of the means for providing a pinned layer and the means for providing a free layer; and

means for providing a first and second lead layer disposed proximate to the means for providing the pinned layer and free layer respectively, the means for providing a first and second lead layer providing a sense current that flows perpendicular to the planes of the layers.